Abstract Submitted
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μSR study of the stoichiometric NbFe2[1] DANIEL MARGINEDA, SEAN GIBLIN, School of Physics and Astronomy Cardiff University, UK, ROSS STEWART, ISIS Facility, Rutherford Appleton Laboratory, UK, JON DUFFY, Department of Physics, University of Warwick, UK, STEPHEN DUGDALE, HH Wills Physics Laboratory, Department of Physics, Bristol, UK, JON TAYLOR, European Spallation Source ERIC, Lund, Sweden — Quantum critical points (QCP) are important as understanding how fluctuating ground states can be lifted by novel correlated electron states such as unconventional superconductivity is not clear. $Nb_{1-y}Fe_{2+y}$ is a good candidate to investigate such criticality as it displays a rich-magnetic phase diagram and quantum criticality in a d-band metal. We investigate the magnetic ground state of stoichiometric $NbFe_2$ by bulk magnetisation and muon spin relaxation. Local magnetism clearly emerges below the critical temperature $T_N = 10.3K$ and is dominated by quasi-static moments with an even distribution of magnetic fields Δ_{eff} ranging from 0 to $\sim 140G$. A small moment of $M \sim 0.02\mu_B/Fe$ is estimated, which is small because of the delocalised electronic distribution. In this work a stronger Curie-Weiss enhancement and an increased critical field suggests sample sensitivity to site mixing effects during the sample growth. Similar results are explained by a Spin Density Wave (SDW) with a large correlation length but the absence of oscillations cannot confirm this scenario: magnetic phase controlled by short-range interactions driven by Nb/Fe site mixing or an incommensurate helical SDW phase could both explain the field random orientation.

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Daniel Margineda
School of Physics and Astronomy Cardiff University, UK

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